

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : SEIKO EPSON CORP

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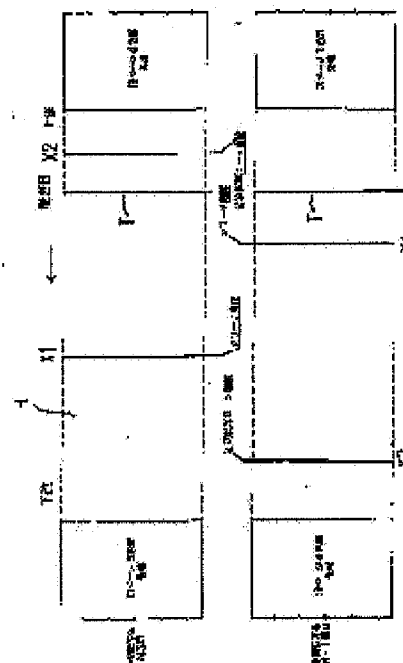
(72)Inventor : FUJITA YOSHIO

## (54) IMAGE FORMING DEVICE

## (57)Abstract:

PROBLEM TO BE SOLVED: To improve durability of a belt while decreasing the load on a cleaner.

SOLUTION: In an image forming device provided with a transfer roll that is installed to be able to be abutted to and separated from a toner image carrier belt and the cleaner, the abutting and separating of the cleaner is carried out on an upstream side or downstream side of a joint T of the toner image carrier belt.



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CLAIMS

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[Claim(s)]

[Claim 1] Image formation equipment characterized by performing \*\*\*\*\* of said cleaner by the upstream or the downstream of a joint of a toner image support belt in image formation equipment equipped with the imprint roller and cleaner which are arranged by the toner image support belt possible [ \*\*\*\*\* ].

[Claim 2] Image formation equipment characterized by contacting said cleaner by the upstream of the joint of a toner image support belt, and estranging a cleaner by the downstream of a joint in image formation equipment equipped with the imprint roller and cleaner which are arranged by the toner image support belt possible [ \*\*\*\*\* ].

[Claim 3] alienation of an imprint roller -- the image formation equipment according to claim 1 or 2 characterized by setting a location as the downstream of the contact location of a cleaner.

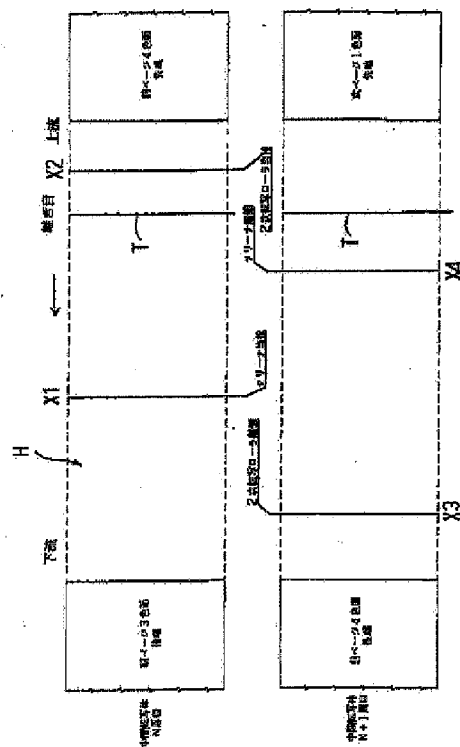
[Claim 4] the contact location of a cleaner -- alienation of an imprint roller -- a location -- the upstream - - and the image formation equipment according to claim 1 to 3 characterized by setting up so that said joint may come between the contact location of a cleaner, and the contact location of an imprint roller.

[Claim 5] Image formation equipment according to claim 1 to 4 characterized by changing the image imprint starting position to a toner image support belt.

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[Translation done.]

Drawing selection [Representative drawing ▼]



[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image formation equipment of the method which imprints the toner image of two or more colors in piles on a toner image support belt especially in image formation equipments, such as a copying machine which uses a xerography etc., a printer, and facsimile.

[0002]

[Description of the Prior Art] The image support 3, such as a photo conductor by which a rotation drive is carried out as conventionally shown in drawing 2 as image formation equipment, The latent-image means forming which carries out sequential formation of the electrostatic latent image of two or more colors on this image support, A development means to develop said electrostatic latent image in the toner image of two or more colors, and the middle imprint belt 7 which rotates in contact with said image support 3, The 1st imprint means T1 which piles up and imprints the toner image of two or more colors on said image support 3 on said middle imprint belt 7, and forms a color picture, The method equipped with the 2nd imprint means T2 which imprints the color picture on said middle imprint belt 7 on imprint material, and a cleaning means 14 to remove the toner which remains to said middle imprint belt 7 is learned.

[0003] In the above-mentioned image formation equipment, when a joint exists in the middle imprint belt 7, in case a toner image is piled up on a belt, it is controlling so that a toner image does not come to a joint, and a joint comes to a non-image field. Moreover, cleaner 14b of the secondary imprint roller 13 in the 2nd imprint means T2 and the cleaning means 14 is made to estrange from the middle imprint belt 7, and is made to contact, while [ being ] performing superposition of each color toner image according to imprint timing so that a toner image may not be disturbed. In this case, also with alienation of cleaner 14b, and \*\*\*\*\* of the secondary imprint roller 13, in order not to disturb the toner image on the middle imprint belt 7, it was carrying out in the non-image field on the middle imprint belt 7 (for example, refer to JP,10-232532,A).

[0004]

[Problem(s) to be Solved by the Invention] Drawing 8 - drawing 10 are drawings for explaining the technical problem of this invention, and they explain this, also referring to drawing 2 . Drawing 9 shows the case where the image field a little shorter than a part for belt 1 round is formed on the middle imprint belt 7, and drawing 8 shows the \*\*\*\*\* location of cleaner 14b in eye a middle imprint object N periphery and the non-image field H in the N+1st round, and the secondary imprint roller 13. Here, the case where it sets up towards the back end in order of alienation (X4 location) of contact (X1 location) of cleaner 14b, alienation (X3 location) of the secondary imprint roller 13, contact (X2 location) of the secondary imprint roller 13, and cleaner 14b from the tip of the non-image field H is considered.

[0005] the last page -- the middle imprint belt 7 is contacted in cleaner 14b in the location X1 through which the back end passed 3 color plane, and it is shown to the secondary imprint roller 13 to imprint material in contact with the middle imprint belt 7 in a location X2. The middle imprint belt 7 rotates in this condition, and the imprint to the imprint material of last page 4 color plane begins. cleaner 14b -- joint T -- getting over -- after that and the last page -- the secondary imprint roller 13 is estranged in the location X3 through which the back end passed 4 color plane, next cleaner 14b overcomes joint T again,

and estranges it in a location X4.

[0006] As shown in drawing 10, although joint T of the middle imprint belt 7 has the method (drawing A) which fixes the both ends of a belt directly, the method (drawing B) which fixes the rear face of a belt by connection member 7b, and the method (drawing C) which fixes a hair side of belt side by connection member 7b, in any case, it has the level difference. Therefore, when it considers as the configuration shown in drawing 8, to one \*\*\*\*\* actuation of cleaner 14b, cleaner 14b will overcome 2 times joint T, and a big burden is placed on cleaner 14b, and it has the problem that the endurance of a belt falls.

[0007] This invention solves the above-mentioned conventional problem, makes the burden in the joint produced at the time of cleaner \*\*\*\*\* to an image support belt mitigate, and aims at offering the image formation equipment which can raise the endurance of a belt.

[0008]

[Means for Solving the Problem] Therefore, the image formation equipment of this invention according to claim 1 In image formation equipment equipped with the imprint roller and cleaner which are arranged by the toner image support belt possible [ \*\*\*\*\* ] It is characterized by performing \*\*\*\*\* of said cleaner by the upstream or the downstream of a joint of a toner image support belt. Invention according to claim 2 In image formation equipment equipped with the imprint roller and cleaner which are arranged by the toner image support belt possible [ \*\*\*\*\* ] Said cleaner is contacted by the upstream of the joint of a toner image support belt, and it is characterized by estranging a cleaner by the downstream of a joint. Invention according to claim 3 It is characterized by setting a location as the downstream of the contact location of a cleaner. claims 1 or 2 -- setting -- alienation of an imprint roller -- invention according to claim 4 claim 1 thru/or either of 3 -- setting -- the contact location of a cleaner -- alienation of an imprint roller -- from a location to the upstream And it is characterized by setting up so that said joint may come between the contact location of a cleaner, and the contact location of an imprint roller, and invention according to claim 5 is characterized by changing the image imprint starting position to a toner image support belt in claim 1 thru/or either of 4.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing. Drawing 1 is the whole block diagram showing the example of the image formation equipment with which this invention is applied. Although this image formation equipment is the color electro photographic printer which can form a full color image with the toner of four colors, this invention is not limited to this and can be applied to all the image formation equipments, such as a copying machine and facsimile.

[0010] It has the housing body 2, a photo conductor 3 is arranged in the housing body 2, and the rotation drive of the image formation equipment 1 is carried out in the direction of an illustration arrow head by the driving means which is not illustrated. Around this photo conductor 3, the cleaning equipment 10 for removing the toner which remains on the middle imprint equipment 9 for imprinting the toner image formed on the development counter unit 6 for developing the exposure unit 5 for forming an electrostatic latent image on the electrification roller 4 as an electrification means and a photo conductor 3 and an electrostatic latent image along that hand of cut and the photo conductor 3 on the middle imprint belt 7 and a photo conductor 3 is arranged.

[0011] the development counter unit 6 -- development counter 6for yellow Y, development counter 6C for cyanogen, and the object for Magentas -- development counter 6M and the object for blacks -- it consisted of development counter 6K, and each development counter is equipped with developing-roller 6b arranged in development housing 6a. And these development counters 6Y, 6C, 6M, and 6K are arranged rockable to a photo conductor 3, respectively, and the contact to a photo conductor 3 only of developing-roller 6b of one development counter is alternatively enabled for every rotation of a photo conductor 3.

[0012] Middle imprint equipment 9 prepares an aluminum vacuum evaporatio no layer in the front face of a PET film, and forms half-conductive coating material in the surface further. The middle imprint belt 7 and the middle imprint belt 7 which carried out the laminating The toner image on the primary imprint roller (primary imprint section) 12 for imprinting the driving roller 11 for rotating the primary imprint electrode roller 8 for carrying out uniform electrification, and the middle imprint belt 7, and the toner image on a photo conductor 3 to the middle imprint belt 7, and the middle imprint belt 7 It consists of

cleaning means 14 grades for removing the residual toner on the secondary imprint roller (secondary imprint section) 13 for imprinting to imprint material, and the middle imprint belt 7. Disjunction of the secondary imprint roller 13 and the cleaning means 14 is made possible from the middle imprint belt 7.

[0013] In the case body 2, the sheet paper cassette 15 by which the bundle of imprint material is contained is arranged, and the medium tray 16 for supplying special imprint material, such as thin paper, an OHP sheet, and an envelope, to the side face of the case body 2 is formed, and the paper output tray 17 which holds the imprint material by which the image was imprinted is formed in the upper part of the case body 2, and the imprint material conveyance way 19 is formed between the sheet paper cassette 15 and the medium tray 16, and the paper output tray 17. Imprint material conveyance way 19a from a sheet paper cassette 15 and imprint material conveyance way 19b from a medium tray 16 are connected with the imprint material conveyance way 19. The anchorage device 20 is arranged in the downstream of the secondary imprint section 13 of the imprint material conveyance way 19. In addition, 21 is an imprint material conveyance way for double-sided printing.

[0014] A pickup roller 22 is formed so that a pressure welding may be carried out to the bundle of imprint material, a pickup roller 22 is approached, it sells to the downstream, and the device 23 is arranged in a sheet paper cassette 15 and the imprint material discharge section of a medium tray 16. Moreover, it sells, the skew correction roller 24 of a pair is formed in the downstream of a device, and the resist roller 25 of a pair is arranged in the downstream of the skew correction roller 24. In addition, 26 is a conveyance roller which conveys the imprint material from a sheet paper cassette 15.

[0015] An operation of the image formation equipment which consists of the above-mentioned configuration is explained. If the image formation signal from the computer which is not illustrated is inputted, the rotation drive of the photo conductor 3 is carried out, the alternative exposure L according to the image information of the 1st amorous glance (for example, yellow) will be made by the exposure unit 5, and the electrostatic latent image of yellow will be formed in the front face of the photo conductor 3 which the front face of a photo conductor 3 was uniformly charged with the electrification roller 4, and was charged uniformly first of it.

[0016] Only developing-roller 6b of development counter 6Y for yellow contacts a photo conductor 3, and the toner image of the electrostatic latent image of yellow is formed on a photo conductor 3 of this. The primary imprint electrical potential difference of the electrification polarity and reversed polarity of the above-mentioned toner image is impressed to the side edge section of the middle imprint belt 7 with the primary imprint electrode roller 8, and the toner image formed on the photo conductor 3 is imprinted on the middle imprint belt 7 in the primary imprint section 12. At this time, the secondary imprint roller 13 and the cleaning means 14 are estranged and evacuated from the middle imprint belt 7. After the residual toner on a photo conductor 3 is removed by cleaning equipment 10 each time, the front face of a photo conductor 3 is discharged by the electric discharge means (not shown).

[0017] Corresponding to the 2nd amorous glance of an image formation signal, the 3rd amorous glance, and the 4th amorous glance, the latent-image formation by one rotation of a photo conductor 3 and the middle imprint belt 7, development, and an imprint are repeated, the toner image of four colors according to the contents of said image formation signal piles up on the middle imprint belt 7, and it lets the above-mentioned actuation see, and it is imprinted. And to the timing to which this full color image reaches the secondary imprint section 13, at this time, the resist roller 25 drives, imprint material is supplied to the secondary imprint section 13 through the imprint material conveyance way 19, while the secondary imprint roller 13 and the cleaning means 14 are contacted by the middle imprint belt 7, a secondary imprint electrical potential difference is impressed to a secondary imprint roller, and the full color toner image on the middle imprint belt 7 is imprinted on imprint material. The residual toner on the middle imprint belt 7 is removed by the cleaning means 14. It is fixed to the imprint image imprinted on imprint material by the anchorage device 20, and it is delivered to a paper output tray 17.

[0018] Drawing 2 is the enlarged drawing of the middle imprint equipment 9 of drawing 1, and, for 30, as for a secondary imprint backup roller and 32, a tension roller and 31 are [ a cleaner backup roller and 33 ] primary imprint support rollers.

[0019] The middle imprint belt 7 prepares an aluminum vacuum evaporatio layer in the front face of a PET film with a thickness of 0.1mm, and half-conductive coating material is further applied to it by the surface by the thickness of 0.02. Moreover, the field where half-conductive coating material is not applied was established in one end of a belt, and the carbon-electrode layer is prepared in the front face

of an aluminum vacuum evaporation layer by width of face of 6.3mm. It has composition which arranges the primary imprint electrode roller 8 in a driving roller 11 and the location which counters, takes to the front face of this carbon-electrode layer with rotation of the middle imprint belt 7, and is carried out the surroundings. The bias from the high voltage power supply which is not illustrated is impressed to the primary imprint electrode roller 8, this bias is impressed to an aluminum vacuum evaporation layer through the carbon-electrode layer of the primary imprint electrode roller 6 and the middle imprint belt 7, and the middle imprint belt 7 has the composition of being charged in homogeneity.

[0020] The toner image on the photo conductor 3 which reached the primary imprint section T1 is primarily imprinted on the middle imprint belt 7 by the primary imprint bias which the photo conductor 3 and the middle imprint belt 7 carried out nip, and was impressed to the aluminum vacuum evaporation layer. It is carried out to the toner image by which sequential formation is carried out on a photo conductor 3 in this, and color matching is carried out on the middle imprint belt 7. at this time, the secondary imprint roller 13 and the cleaning means 14 do not disturb the toner image on the middle imprint belt 7 -- as -- alienation -- it changes into the condition. While the primary imprint of the toner image of the last color (for example, four amorous glance) is started on a middle imprint object belt, the piled-up image reaches to the secondary imprint section T2 with rotation of the middle imprint belt 7 and imprint material is guided in the second [ in all ] imprint section T2 at this timing, the secondary imprint roller 13 is contacted by the middle imprint belt 7. High-pressure bias is impressed to the shank by the high voltage power supply which is not illustrated on the secondary imprint roller 13, and the package imprint of the toner image on the middle imprint belt 7 is carried out by operation of the electric field at imprint material.

[0021] The secondary imprint roller 13 is supported by \*\*\*\*\* frame 13a, and \*\*\*\*\* frame 13a is supported free [ rotation ] centering on the rocking lever shaft to the frame of a middle imprint object unit. A cam follower is prepared in secondary imprint \*\*\*\*\* frame 13a forward and backward, and he is trying to regulate rotation of \*\*\*\*\* frame 13a because secondary imprint \*\*\*\*\* cam 13b guides this cam follower. It connects with the motor which is not illustrated on the shaft of \*\*\*\*\* cam 13b through the clutch, and rotation of secondary imprint \*\*\*\*\* cam 13b is regulated, and it is made to perform \*\*\*\*\* actuation of the secondary imprint roller 13 by turning this clutch on and off.

[0022] The toner which remained without imprinting secondarily on the middle imprint object 7 reaches to the cleaning means 14, timing is doubled with this, and contact of cleaner 14b is performed. At the moment, if a cleaner 14b tip contacts the middle imprint object 7, since the pressure is weak, the toner which has adhered at the tip of cleaner 14b will return on the middle imprint belt 7, and muscle-like dirt will adhere on the middle imprint belt 7. Then, a predetermined pressure is applied to cleaner 14b, and it will be in the condition which can be cleaned.

[0023] The cleaning means 14 Cleaner case 14a and cleaner (cleaning blade) 14b, It has cleaner \*\*\*\*\* cam 14e for saving and making sheet 14c and cleaner 14b \*\*\*\*\* to the middle imprint belt 7. It connects with the motor which is not illustrated on the shaft of \*\*\*\*\* cam 14e through the clutch, and rotation of cleaner \*\*\*\*\* cam 14e is regulated, and it is made to perform \*\*\*\*\* actuation of cleaner 14b by turning this clutch on and off.

[0024] Drawing 3 shows 1 operation gestalt of this invention, is drawing for explaining the location of \*\*\*\*\* of a cleaner and a secondary imprint roller, and shows the location of \*\*\*\*\* of eye a middle imprint object N periphery, cleaner 14b in the non-image field H in the N+1st round, and the secondary imprint roller 13 by the case where a toner image a little shorter than a part for belt 1 round is imprinted on the middle imprint belt 7.

[0025] while locating joint T in the non-image field H of the middle imprint object 7 in this operation gestalt -- the contact location X1 of cleaner 14b, and alienation of cleaner 14b -- both the locations X4 are set as the downstream of joint T. therefore, the last page -- the middle imprint object belt 7 after cleaner 14b contacts the middle imprint belt 7 in the location X1 through which the back end passed 3 color plane -- rotating -- cleaner 14b -- joint T -- getting over -- the last page -- the back end passes 4 color plane, and it is estranged in the location X4 of the downstream of joint T. therefore, joint T of cleaner 14b -- getting over -- it becomes 1 time and the burden of cleaner 14b will be reduced.

[0026] moreover, this operation gestalt -- setting -- alienation of the secondary imprint roller 13 -- the location X3 is set as the downstream of the contact location X1 of cleaner 14b. the last page -- when the

middle imprint belt 7 is contacted in cleaner 14b in the location X1 through which the back end passed 3 color plane, muscle-like dirt adheres on the middle imprint belt 7. Moreover, in contact with the middle imprint belt 7, it is shown to the secondary imprint roller 13 to imprint material in a location X2. A middle imprint object belt rotates in this condition, and the imprint to the imprint material of last page 4 color plane begins. then, the last page -- before the location X3 through which the back end passed 4 color plane, and said cleaner contact sources (location X1) reach the secondary imprint section T2, the secondary imprint roller 13 is estranged. Therefore, the secondary imprint roller 13 is not polluted with this muscle-like dirt.

[0027] furthermore, this operation gestalt -- setting -- the contact location X1 of cleaner 14b -- alienation of the secondary imprint roller 13 -- it has set up so that it may be in the upstream from a location X3 and joint T may come between the contact location X1 of cleaner 14b, and the contact location X2 of the secondary imprint roller 13. cleaner 14b -- the last page -- the back end passes 4 color plane, and it is estranged in the location X4 of the downstream of joint T. Since there is almost no pressure in a blade the moment cleaner 14b separates from the middle imprint belt 7, muscle-like dirt adheres on the middle imprint belt 7.

[0028] During continuation printing, the next printing actuation is started with this condition, and if the tip of the toner image which degree page piled up on the middle imprint belt 7 reaches the secondary imprint section T2, the secondary imprint roller 13 will be contacted. this contact timing -- the above-mentioned cleaner -- alienation -- after muscle dirt exceeds the secondary imprint section T2, it is made to make it contact. Therefore, the secondary imprint roller 13 is not polluted with this dirt.

[0029] Again, contact of cleaner 14b is performed according to the point of a residual toner. this time -- alienation of a previous cleaner -- since cleaner 14b contacts the middle imprint belt 7 before muscle dirt reaches the cleaning section -- alienation of a cleaner -- muscle dirt can be cleaned. During continuation printing, actuation of these single strings is repeated, and printing actuation can be performed, without polluting the secondary imprint roller 13.

[0030] Moreover, contact of the secondary imprint roller 13 is performed after joint T goes past. Since there is a level difference as shown in drawing 10, a toner (black part) tends to collect here and joint T has become, and when the secondary imprint roller 13 steps on this part, it will be polluted with a toner. In this operation gestalt, the dirt of the secondary imprint roller 13 can be prevented by making the secondary imprint roller 13 contact, after passing joint T.

[0031] Drawing 4 is drawing showing the timing chart of drawing 3. Here, a reference signal is a signal generated by detecting opening hole 7a ( drawing 9 ) prepared in the middle imprint object 7 by the transparency mold sensor, 1 time per rotation of the middle imprint belt 7 of a signal is outputted, and the following timing is created based on this signal. Primary imprint timing is timing by which the toner image on a photo conductor 3 comes to the primary imprint section T1, and is imprinting four colors by 2 pages in this example. A gate roller is timing by which imprint material comes with a gate roller, and it is shown to it to imprint material in the second [ in all ] imprint section T2 at the timing to which the image which four colors piled up reaches the secondary imprint section T2. A secondary imprint roller \*\*\*\*\* clutch is timing which a secondary imprint roller \*\*\*\*\* clutch turns on and off, it is late for this timing for a while, and the secondary imprint roller 13 is \*\*\*\*\* (ed) by the middle imprint object 7. Secondary imprint timing is timing by which the image put on the middle imprint belt 7 on the secondary imprint section T2 comes. A cleaner \*\*\*\*\* clutch is timing which a cleaner \*\*\*\*\* clutch turns on and off, and after a cleaner \*\*\*\*\* clutch turns cleaner \*\*\*\*\* on and off, a cleaner is contact or the timing which carries out non-contact at the middle imprint belt 7.

[0032] Drawing 5 shows other operation gestalten of this invention, and is the same drawing as drawing 3. In addition, in the following explanation, the same number is attached about the same configuration as drawing 3, and explanation is omitted. Although these disjunction locations X1 and X4 of cleaner 14b are set as the downstream of joint T, it is [ in / both / the operation gestalt of drawing 3 / in / both / this operation gestalt ] different in that these disjunction locations X1 and X4 of cleaner 14b are set as the upstream of joint T. What is necessary is just to, set both these disjunction locations X1 and X4 of cleaner 14b as one near non-image field H of joint T in short.

[0033] Drawing 6 shows other operation gestalten of this invention, and is the perspective view of the middle imprint belt 7. In the image formation equipment using a middle imprint belt, in order to print without not dropping a throughput, that is, putting in the idling for cleaning, \*\*\*\*\* of a cleaner must be



performed in a non-image field in order not to disturb the toner image on a middle imprint belt. Since there is variation by manufacture tolerance, the one where a non-image field is longer tends to carry out the design of timing to the timing which a cleaner actually \*\*\*\*\* to a middle imprint belt. However, since it is decided by the perimeter and image die length of a middle imprint belt, in order to lengthen a non-image field, the die length of a non-image field will cause a cost rise while it needs to lengthen the perimeter of a middle imprint belt, therefore equipment enlarges it.

[0034] Then, in this operation gestalt, it constitutes so that the image imprint starting position on the middle imprint belt 7 may be changed. As shown in drawing 9, opening hole 7a is prepared in the reverse edge of the above-mentioned carbon electrode, by reading this by the transparency mold sensor, a reference signal is taken out to the middle imprint belt 7, and the image is imprinted on the basis of this signal to it. since a reference signal is inputted now -- after t1 (sec) -- an image -- imprinting -- beginning -- the joint T location at this time -- the t2 (sec) downstream from an image tip -- being located -- \*\*\*\*\* of a cleaner -- a radical [ reference signal ] -- operating -- contact and alienation -- when timing is operated after t3 and t4 (sec) from a reference signal, respectively, each location on a middle imprint belt comes to be shown in drawing 9. That is, \*\*\*\*\* of a cleaner is divided into the vertical style side bordering on joint T.

[0035] Then, as shown in drawing 6, an image imprint starting position is alpha (sec) Made to send, it considers as the t1+alpha (sec) back, and \*\*\*\*\* of a cleaner is similarly made into the t3+alpha and t4+alpha (sec) back. By this, the \*\*\*\*\* location of a cleaner will go into the upstream of joint T. That is, without changing the die length of a non-image field by changing an image imprint starting position, the timing of \*\*\*\*\* of a cleaner can be set up easily and the variation in \*\*\*\*\* of a cleaner can be absorbed. In addition, what is necessary is just to bring an image imprint starting position forward, in making both the \*\*\*\*\* locations of a cleaner into the downstream of joint T.

[0036] Drawing 7 shows other operation gestalten of this invention, and is the same drawing as drawing 3. this operation gestalt -- setting -- the contact location X1 of cleaner 14b -- the upstream of joint T -- carrying out -- alienation of cleaner 14b -- the location X4 is set up so that it may come to the downstream of joint T. According to this, after contact of cleaner 14b passes over joint T, it is performed, and after that, the secondary imprint roller 13 is contacted, a secondary imprint is performed, and if the middle imprint belt 7 carries out 1 rotation weakness, the secondary imprint 13 will be estranged. Then, cleaner 14b estranges before joint T. Therefore, the load of cleaner 14b by not overcoming joint T once and overcoming joint T can be lost after cleaner 14b contacts until it estranges. however -- this operation gestalt -- alienation of cleaner 14b -- since cleaner 14b contacts in the following cycle after a muscle goes past -- a cleaner -- alienation -- what is necessary is just to remove this in a cleaning cycle separately, although a muscle will always remain

[0037] As mentioned above, although the gestalt of operation of this invention was explained, this invention is not limited to this and various modification is possible for it. For example, in the above-mentioned operation gestalt, although the example applied to the middle imprint belt as toner image support is explained, it is applicable also to the method which piles up a toner image on a sensitized material belt.

[0038]

[Effect of the Invention] according to [ so that clearly from the above explanation ] invention according to claim 1 -- the joint of a cleaner -- getting over -- it becoming 1 time, the burden of a cleaner being reduced, and the endurance of a belt being raised, and according to invention according to claim 2 Riding \*\*\*\* of the joint of a cleaner is lost and the burden of a cleaner is reduced further, and according to invention according to claim 3 according to [ can prevent contamination of the imprint roller by cleaner contact sources, and ] invention according to claim 4 -- a cleaner -- alienation, while being able to prevent contamination of the imprint roller by the muscle Without being able to prevent contamination of the imprint roller by the toner adhering to a joint, and changing the die length of a non-image field according to invention according to claim 5, the timing of \*\*\*\*\* of a cleaner can be set up easily and the variation in \*\*\*\*\* of a cleaner can be absorbed.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the image formation equipment of the method which imprints the toner image of two or more colors in piles on a toner image support belt especially in image formation equipments, such as a copying machine which uses a xerography etc., a printer, and facsimile.

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PRIOR ART

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[Description of the Prior Art] The image support 3, such as a photo conductor by which a rotation drive is carried out as conventionally shown in drawing 2 as image formation equipment, The latent-image means forming which carries out sequential formation of the electrostatic latent image of two or more colors on this image support, A development means to develop said electrostatic latent image in the toner image of two or more colors, and the middle imprint belt 7 which rotates in contact with said image support 3, The 1st imprint means T1 which piles up and imprints the toner image of two or more colors on said image support 3 on said middle imprint belt 7, and forms a color picture, The method equipped with the 2nd imprint means T2 which imprints the color picture on said middle imprint belt 7 on imprint material, and a cleaning means 14 to remove the toner which remains to said middle imprint belt 7 is learned.

[0003] In the above-mentioned image formation equipment, when a joint exists in the middle imprint belt 7, in case a toner image is piled up on a belt, it is controlling so that a toner image does not come to a joint, and a joint comes to a non-image field. Moreover, cleaner 14b of the secondary imprint roller 13 in the 2nd imprint means T2 and the cleaning means 14 is made to estrange from the middle imprint belt 7, and is made to contact, while [ being ] performing superposition of each color toner image according to imprint timing so that a toner image may not be disturbed. In this case, also with alienation of cleaner 14b, and \*\*\*\*\* of the secondary imprint roller 13, in order not to disturb the toner image on the middle imprint belt 7, it was carrying out in the non-image field on the middle imprint belt 7 (for example, refer to JP,10-232532,A).

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EFFECT OF THE INVENTION

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[Effect of the Invention] according to [ so that clearly from the above explanation ] invention according to claim 1 -- the joint of a cleaner -- getting over -- it becoming 1 time, the burden of a cleaner being reduced, and the endurance of a belt being raised, and according to invention according to claim 2 Riding \*\*\*\* of the joint of a cleaner is lost and the burden of a cleaner is reduced further, and according to invention according to claim 3 according to [ can prevent contamination of the imprint roller by cleaner contact sources, and ] invention according to claim 4 -- a cleaner -- alienation, while being able to prevent contamination of the imprint roller by the muscle Without being able to prevent contamination of the imprint roller by the toner adhering to a joint, and changing the die length of a non-image field according to invention according to claim 5, the timing of \*\*\*\*\* of a cleaner can be set up easily and the variation in \*\*\*\*\* of a cleaner can be absorbed.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] Drawing 8 - drawing 10 are drawings for explaining the technical problem of this invention, and they explain this, also referring to drawing 2. Drawing 9 shows the case where the image field a little shorter than a part for belt 1 round is formed on the middle imprint belt 7, and drawing 8 shows the \*\*\*\*\* location of cleaner 14b in eye a middle imprint object N periphery and the non-image field H in the N+1st round, and the secondary imprint roller 13. Here, the case where it sets up towards the back end in order of alienation (X4 location) of contact (X1 location) of cleaner 14b, alienation (X3 location) of the secondary imprint roller 13, contact (X2 location) of the secondary imprint roller 13, and cleaner 14b from the tip of the non-image field H is considered.

[0005] the last page -- the middle imprint belt 7 is contacted in cleaner 14b in the location X1 through which the back end passed 3 color plane, and it is shown to the secondary imprint roller 13 to imprint material in contact with the middle imprint belt 7 in a location X2. The middle imprint belt 7 rotates in this condition, and the imprint to the imprint material of last page 4 color plane begins. cleaner 14b -- joint T -- getting over -- after that and the last page -- the secondary imprint roller 13 is estranged in the location X3 through which the back end passed 4 color plane, next cleaner 14b overcomes joint T again, and estranges it in a location X4.

[0006] As shown in drawing 10, although joint T of the middle imprint belt 7 has the method (drawing A) which fixes the both ends of a belt directly, the method (drawing B) which fixes the rear face of a belt by connection member 7b, and the method (drawing C) which fixes a hair side of belt side by connection member 7b, in any case, it has the level difference. Therefore, when it considers as the configuration shown in drawing 8, to one \*\*\*\*\* actuation of cleaner 14b, cleaner 14b will overcome 2 times joint T, and a big burden is placed on cleaner 14b, and it has the problem that the endurance of a belt falls.

[0007] This invention solves the above-mentioned conventional problem, makes the burden in the joint produced at the time of cleaner \*\*\*\*\* to an image support belt mitigate, and aims at offering the image formation equipment which can raise the endurance of a belt.

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[Translation done.]

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MEANS

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[Means for Solving the Problem] Therefore, the image formation equipment of this invention according to claim 1 In image formation equipment equipped with the imprint roller and cleaner which are arranged by the toner image support belt possible [ \*\*\*\*\* ] It is characterized by performing \*\*\*\*\* of said cleaner by the upstream or the downstream of a joint of a toner image support belt. Invention according to claim 2 In image formation equipment equipped with the imprint roller and cleaner which are arranged by the toner image support belt possible [ \*\*\*\*\* ] Said cleaner is contacted by the upstream of the joint of a toner image support belt, and it is characterized by estranging a cleaner by the downstream of a joint. Invention according to claim 3 It is characterized by setting a location as the downstream of the contact location of a cleaner, claims 1 or 2 -- setting -- alienation of an imprint roller -- invention according to claim 4 claim 1 thru/or either of 3 -- setting -- the contact location of a cleaner -- alienation of an imprint roller -- from a location to the upstream And it is characterized by setting up so that said joint may come between the contact location of a cleaner, and the contact location of an imprint roller, and invention according to claim 5 is characterized by changing the image imprint starting position to a toner image support belt in claim 1 thru/or either of 4.

[0009]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing. Drawing 1 is the whole block diagram showing the example of the image formation equipment with which this invention is applied. Although this image formation equipment is the color electro photographic printer which can form a full color image with the toner of four colors, this invention is not limited to this and can be applied to all the image formation equipments, such as a copying machine and facsimile.

[0010] It has the housing body 2, a photo conductor 3 is arranged in the housing body 2, and the rotation drive of the image formation equipment 1 is carried out in the direction of an illustration arrow head by the driving means which is not illustrated. Around this photo conductor 3, the cleaning equipment 10 for removing the toner which remains on the middle imprint equipment 9 for imprinting the toner image formed on the development counter unit 6 for developing the exposure unit 5 for forming an electrostatic latent image on the electrification roller 4 as an electrification means and a photo conductor 3 and an electrostatic latent image along that hand of cut and the photo conductor 3 on the middle imprint belt 7 and a photo conductor 3 is arranged.

[0011] the development counter unit 6 -- development counter 6 for yellow Y, development counter 6C for cyanogen, and the object for Magentas -- development counter 6M and the object for blacks -- it consisted of development counter 6K, and each development counter is equipped with developing-roller 6b arranged in development housing 6a. And these development counters 6Y, 6C, 6M, and 6K are arranged rockable to a photo conductor 3, respectively, and the contact to a photo conductor 3 only of developing-roller 6b of one development counter is alternatively enabled for every rotation of a photo conductor 3.

[0012] Middle imprint equipment 9 prepares an aluminum vacuum evaporation layer in the front face of a PET film, and forms half-conductive coating material in the surface further. The middle imprint belt 7 and the middle imprint belt 7 which carried out the laminating The toner image on the primary imprint roller (primary imprint section) 12 for imprinting the driving roller 11 for rotating the primary imprint electrode roller 8 for carrying out uniform electrification, and the middle imprint belt 7, and the toner

image on a photo conductor 3 to the middle imprint belt 7, and the middle imprint belt 7 It consists of cleaning means 14 grades for removing the residual toner on the secondary imprint roller (secondary imprint section) 13 for imprinting to imprint material, and the middle imprint belt 7. Disjunction of the secondary imprint roller 13 and the cleaning means 14 is made possible from the middle imprint belt 7. [0013] In the case body 2, the sheet paper cassette 15 by which the bundle of imprint material is contained is arranged, and the medium tray 16 for supplying special imprint material, such as thin paper, an OHP sheet, and an envelope, to the side face of the case body 2 is formed, and the paper output tray 17 which holds the imprint material by which the image was imprinted is formed in the upper part of the case body 2, and the imprint material conveyance way 19 is formed between the sheet paper cassette 15 and the medium tray 16, and the paper output tray 17. Imprint material conveyance way 19a from a sheet paper cassette 15 and imprint material conveyance way 19b from a medium tray 16 are connected with the imprint material conveyance way 19. The anchorage device 20 is arranged in the downstream of the secondary imprint section 13 of the imprint material conveyance way 19. In addition, 21 is an imprint material conveyance way for double-sided printing.

[0014] A pickup roller 22 is formed so that a pressure welding may be carried out to the bundle of imprint material, a pickup roller 22 is approached, it sells to the downstream, and the device 23 is arranged in a sheet paper cassette 15 and the imprint material discharge section of a medium tray 16. Moreover, it sells, the skew correction roller 24 of a pair is formed in the downstream of a device, and the resist roller 25 of a pair is arranged in the downstream of the skew correction roller 24. In addition, 26 is a conveyance roller which conveys the imprint material from a sheet paper cassette 15.

[0015] An operation of the image formation equipment which consists of the above-mentioned configuration is explained. If the image formation signal from the computer which is not illustrated is inputted, the rotation drive of the photo conductor 3 is carried out, the alternative exposure L according to the image information of the 1st amorous glance (for example, yellow) will be made by the exposure unit 5, and the electrostatic latent image of yellow will be formed in the front face of the photo conductor 3 which the front face of a photo conductor 3 was uniformly charged with the electrification roller 4, and was charged uniformly first of it.

[0016] Only developing-roller 6b of development counter 6Y for yellow contacts a photo conductor 3, and the toner image of the electrostatic latent image of yellow is formed on a photo conductor 3 of this. The primary imprint electrical potential difference of the electrification polarity and reversed polarity of the above-mentioned toner image is impressed to the side edge section of the middle imprint belt 7 with the primary imprint electrode roller 8, and the toner image formed on the photo conductor 3 is imprinted on the middle imprint belt 7 in the primary imprint section 12. At this time, the secondary imprint roller 13 and the cleaning means 14 are estranged and evacuated from the middle imprint belt 7. After the residual toner on a photo conductor 3 is removed by cleaning equipment 10 each time, the front face of a photo conductor 3 is discharged by the electric discharge means (not shown).

[0017] Corresponding to the 2nd amorous glance of an image formation signal, the 3rd amorous glance, and the 4th amorous glance, the latent-image formation by one rotation of a photo conductor 3 and the middle imprint belt 7, development, and an imprint are repeated, the toner image of four colors according to the contents of said image formation signal piles up on the middle imprint belt 7, and it lets the above-mentioned actuation see, and it is imprinted. And to the timing to which this full color image reaches the secondary imprint section 13, at this time, the resist roller 25 drives, imprint material is supplied to the secondary imprint section 13 through the imprint material conveyance way 19, while the secondary imprint roller 13 and the cleaning means 14 are contacted by the middle imprint belt 7, a secondary imprint electrical potential difference is impressed to a secondary imprint roller, and the full color toner image on the middle imprint belt 7 is imprinted on imprint material. The residual toner on the middle imprint belt 7 is removed by the cleaning means 14. It is fixed to the imprint image imprinted on imprint material by the anchorage device 20, and it is delivered to a paper output tray 17.

[0018] Drawing 2 is the enlarged drawing of the middle imprint equipment 9 of drawing 1, and, for 30, as for a secondary imprint backup roller and 32, a tension roller and 31 are [ a cleaner backup roller and 33 ] primary imprint support rollers.

[0019] The middle imprint belt 7 prepares an aluminum vacuum evaporatio layer in the front face of a PET film with a thickness of 0.1mm, and half-conductive coating material is further applied to it by the surface by the thickness of 0.02. Moreover, the field where half-conductive coating material is not

applied was established in one end of a belt, and the carbon-electrode layer is prepared in the front face of an aluminum vacuum evaporation layer by width of face of 6.3mm. It has composition which arranges the primary imprint electrode roller 8 in a driving roller 11 and the location which counters, takes to the front face of this carbon-electrode layer with rotation of the middle imprint belt 7, and is carried out the surroundings. The bias from the high voltage power supply which is not illustrated is impressed to the primary imprint electrode roller 8, this bias is impressed to an aluminum vacuum evaporation layer through the carbon-electrode layer of the primary imprint electrode roller 6 and the middle imprint belt 7, and the middle imprint belt 7 has the composition of being charged in homogeneity.

[0020] The toner image on the photo conductor 3 which reached the primary imprint section T1 is primarily imprinted on the middle imprint belt 7 by the primary imprint bias which the photo conductor 3 and the middle imprint belt 7 carried out nip, and was impressed to the aluminum vacuum evaporation layer. It is carried out to the toner image by which sequential formation is carried out on a photo conductor 3 in this, and color matching is carried out on the middle imprint belt 7. at this time, the secondary imprint roller 13 and the cleaning means 14 do not disturb the toner image on the middle imprint belt 7 -- as -- alienation -- it changes into the condition, While the primary imprint of the toner image of the last color (for example, four amorous glance) is started on a middle imprint object belt, the piled-up image reaches to the secondary imprint section T2 with rotation of the middle imprint belt 7 and imprint material is guided in the second [ in all ] imprint section T2 at this timing, the secondary imprint roller 13 is contacted by the middle imprint belt 7. High-pressure bias is impressed to the shank by the high voltage power supply which is not illustrated on the secondary imprint roller 13, and the package imprint of the toner image on the middle imprint belt 7 is carried out by operation of the electric field at imprint material.

[0021] The secondary imprint roller 13 is supported by \*\*\*\*\* frame 13a, and \*\*\*\*\* frame 13a is supported free [ rotation ] centering on the rocking lever shaft to the frame of a middle imprint object unit. A cam follower is prepared in secondary imprint \*\*\*\*\* frame 13a forward and backward, and he is trying to regulate rotation of \*\*\*\*\* frame 13a because secondary imprint \*\*\*\*\* cam 13b guides this cam follower. It connects with the motor which is not illustrated on the shaft of \*\*\*\*\* cam 13b through the clutch, and rotation of secondary imprint \*\*\*\*\* cam 13b is regulated, and it is made to perform \*\*\*\*\* actuation of the secondary imprint roller 13 by turning this clutch on and off.

[0022] The toner which remained without imprinting secondarily on the middle imprint object 7 reaches to the cleaning means 14, timing is doubled with this, and contact of cleaner 14b is performed. At the moment, if a cleaner 14b tip contacts the middle imprint object 7, since the pressure is weak, the toner which has adhered at the tip of cleaner 14b will return on the middle imprint belt 7, and muscle-like dirt will adhere on the middle imprint belt 7. Then, a predetermined pressure is applied to cleaner 14b, and it will be in the condition which can be cleaned.

[0023] The cleaning means 14 Cleaner case 14a and cleaner (cleaning blade) 14b, It has cleaner \*\*\*\*\* cam 14e for saving and making sheet 14c and cleaner 14b \*\*\*\*\* to the middle imprint belt 7. It connects with the motor which is not illustrated on the shaft of \*\*\*\*\* cam 14e through the clutch, and rotation of cleaner \*\*\*\*\* cam 14e is regulated, and it is made to perform \*\*\*\*\* actuation of cleaner 14b by turning this clutch on and off.

[0024] Drawing 3 shows 1 operation gestalt of this invention, is drawing for explaining the location of \*\*\*\*\* of a cleaner and a secondary imprint roller, and shows the location of \*\*\*\*\* of eye a middle imprint object N periphery, cleaner 14b in the non-image field H in the N+1st round, and the secondary imprint roller 13 by the case where a toner image a little shorter than a part for belt 1 round is imprinted on the middle imprint belt 7.

[0025] while locating joint T in the non-image field H of the middle imprint object 7 in this operation gestalt -- the contact location X1 of cleaner 14b, and alienation of cleaner 14b -- both the locations X4 are set as the downstream of joint T. therefore, the last page -- the middle imprint object belt 7 after cleaner 14b contacts the middle imprint belt 7 in the location X1 through which the back end passed 3 color plane -- rotating -- cleaner 14b -- joint T -- getting over -- the last page -- the back end passes 4 color plane, and it is estranged in the location X4 of the downstream of joint T. therefore, joint T of cleaner 14b -- getting over -- it becomes 1 time and the burden of cleaner 14b will be reduced.

[0026] moreover, this operation gestalt -- setting -- alienation of the secondary imprint roller 13 -- the



location X3 is set as the downstream of the contact location X1 of cleaner 14b. the last page -- when the middle imprint belt 7 is contacted in cleaner 14b in the location X1 through which the back end passed 3 color plane, muscle-like dirt adheres on the middle imprint belt 7. Moreover, in contact with the middle imprint belt 7, it is shown to the secondary imprint roller 13 to imprint material in a location X2. A middle imprint object belt rotates in this condition, and the imprint to the imprint material of last page 4 color plane begins. then, the last page -- before the location X3 through which the back end passed 4 color plane, and said cleaner contact sources (location X1) reach the secondary imprint section T2, the secondary imprint roller 13 is estranged. Therefore, the secondary imprint roller 13 is not polluted with this muscle-like dirt.

[0027] furthermore, this operation gestalt -- setting -- the contact location X1 of cleaner 14b -- alienation of the secondary imprint roller 13 -- it has set up so that it may be in the upstream from a location X3 and joint T may come between the contact location X1 of cleaner 14b, and the contact location X2 of the secondary imprint roller 13. cleaner 14b -- the last page -- the back end passes 4 color plane, and it is estranged in the location X4 of the downstream of joint T. Since there is almost no pressure in a blade the moment cleaner 14b separates from the middle imprint belt 7, muscle-like dirt adheres on the middle imprint belt 7.

[0028] During continuation printing, the next printing actuation is started with this condition, and if the tip of the toner image which degree page piled up on the middle imprint belt 7 reaches the secondary imprint section T2, the secondary imprint roller 13 will be contacted. this contact timing -- the above-mentioned cleaner -- alienation -- after muscle dirt exceeds the secondary imprint section T2, it is made to make it contact. Therefore, the secondary imprint roller 13 is not polluted with this dirt.

[0029] Again, contact of cleaner 14b is performed according to the point of a residual toner. this time -- alienation of a previous cleaner -- since cleaner 14b contacts the middle imprint belt 7 before muscle dirt reaches the cleaning section -- alienation of a cleaner -- muscle dirt can be cleaned. During continuation printing, actuation of these single strings is repeated, and printing actuation can be performed, without polluting the secondary imprint roller 13.

[0030] Moreover, contact of the secondary imprint roller 13 is performed after joint T goes past. Since there is a level difference as shown in drawing 10, a toner (black part) tends to collect here and joint T has become, and when the secondary imprint roller 13 steps on this part, it will be polluted with a toner. In this operation gestalt, the dirt of the secondary imprint roller 13 can be prevented by making the secondary imprint roller 13 contact, after passing joint T.

[0031] Drawing 4 is drawing showing the timing chart of drawing 3. Here, a reference signal is a signal generated by detecting opening hole 7a ( drawing 9 ) prepared in the middle imprint object 7 by the transparency mold sensor, 1 time per rotation of the middle imprint belt 7 of a signal is outputted, and the following timing is created based on this signal. Primary imprint timing is timing by which the toner image on a photo conductor 3 comes to the primary imprint section T1, and is imprinting four colors by 2 pages in this example. A gate roller is timing by which imprint material comes with a gate roller, and it is shown to it to imprint material in the second [ in / all ] imprint section T2 at the timing to which the image which four colors piled up reaches the secondary imprint section T2. A secondary imprint roller \*\*\*\*\* clutch is timing which a secondary imprint roller \*\*\*\*\* clutch turns on and off, it is late for this timing for a while, and the secondary imprint roller 13 is \*\*\*\*\* (ed) by the middle imprint object 7. Secondary imprint timing is timing by which the image put on the middle imprint belt 7 on the secondary imprint section T2 comes. A cleaner \*\*\*\*\* clutch is timing which a cleaner \*\*\*\*\* clutch turns on and off, and after a cleaner \*\*\*\*\* clutch turns cleaner \*\*\*\*\* on and off, a cleaner is contact or the timing which carries out non-contact at the middle imprint belt 7.

[0032] Drawing 5 shows other operation gestalten of this invention, and is the same drawing as drawing 3. In addition, in the following explanation, the same number is attached about the same configuration as drawing 3, and explanation is omitted. Although these disjunction locations X1 and X4 of cleaner 14b are set as the downstream of joint T, it is [ in / both / the operation gestalt of drawing 3 / in / both / this operation gestalt ] different in that these disjunction locations X1 and X4 of cleaner 14b are set as the upstream of joint T. What is necessary is just to, set both these disjunction locations X1 and X4 of cleaner 14b as one near non-image field H of joint T in short.

[0033] Drawing 6 shows other operation gestalten of this invention, and is the perspective view of the middle imprint belt 7. In the image formation equipment using a middle imprint belt, in order to print

without not dropping a throughput, that is, putting in the idling for cleaning, \*\*\*\*\* of a cleaner must be performed in a non-image field in order not to disturb the toner image on a middle imprint belt. Since there is variation by manufacture tolerance, the one where a non-image field is longer tends to carry out the design of timing to the timing which a cleaner actually \*\*\*\*\* to a middle imprint belt. However, since it is decided by the perimeter and image die length of a middle imprint belt, in order to lengthen a non-image field, the die length of a non-image field will cause a cost rise while it needs to lengthen the perimeter of a middle imprint belt, therefore equipment enlarges it.

[0034] Then, in this operation gestalt, it constitutes so that the image imprint starting position on the middle imprint belt 7 may be changed. As shown in drawing 9, opening hole 7a is prepared in the reverse edge of the above-mentioned carbon electrode, by reading this by the transparency mold sensor, a reference signal is taken out to the middle imprint belt 7, and the image is imprinted on the basis of this signal to it. since a reference signal is inputted now -- after t1 (sec) -- an image -- imprinting -- beginning -- the joint T location at this time -- the t2 (sec) downstream from an image tip -- being located -- \*\*\*\*\* of a cleaner -- a radical [ reference signal ] -- operating -- contact and alienation -- when timing is operated after t3 and t4 (sec) from a reference signal, respectively, each location on a middle imprint belt comes to be shown in drawing 9. That is, \*\*\*\*\* of a cleaner is divided into the vertical style side bordering on joint T.

[0035] Then, as shown in drawing 6, an image imprint starting position is alpha (sec) Made to send, it considers as the t1+alpha (sec) back, and \*\*\*\*\* of a cleaner is similarly made into the t3+alpha and t4+alpha (sec) back. By this, the \*\*\*\*\* location of a cleaner will go into the upstream of joint T. That is, without changing the die length of a non-image field by changing an image imprint starting position, the timing of \*\*\*\*\* of a cleaner can be set up easily and the variation in \*\*\*\*\* of a cleaner can be absorbed. In addition, what is necessary is just to bring an image imprint starting position forward, in making both the \*\*\*\*\* locations of a cleaner into the downstream of joint T.

[0036] Drawing 7 shows other operation gestalten of this invention, and is the same drawing as drawing 3. this operation gestalt -- setting -- the contact location X1 of cleaner 14b -- the upstream of joint T -- carrying out -- alienation of cleaner 14b -- the location X4 is set up so that it may come to the downstream of joint T. According to this, after contact of cleaner 14b passes over joint T, it is performed, and after that, the secondary imprint roller 13 is contacted, a secondary imprint is performed, and if the middle imprint belt 7 carries out 1 rotation weakness, the secondary imprint 13 will be estranged. Then, cleaner 14b estranges before joint T. Therefore, the load of cleaner 14b by not overcoming joint T once and overcoming joint T can be lost after cleaner 14b contacts until it estranges. however -- this operation gestalt -- alienation of cleaner 14b -- since cleaner 14b contacts in the following cycle after a muscle goes past -- a cleaner -- alienation -- what is necessary is just to remove this in a cleaning cycle separately, although a muscle will always remain

[0037] As mentioned above, although the gestalt of operation of this invention was explained, this invention is not limited to this and various modification is possible for it. For example, in the above-mentioned operation gestalt, although the example applied to the middle imprint belt as toner image support is explained, it is applicable also to the method which piles up a toner image on a sensitized material belt.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the whole block diagram showing the example of the image formation equipment with which this invention is applied.

[Drawing 2] It is the enlarged drawing of the middle imprint equipment 9 of drawing 1 .

[Drawing 3] It is drawing showing the \*\*\*\*\* location of the cleaner in this invention, and a secondary imprint roller.

[Drawing 4] It is drawing showing the timing chart of drawing 3 .

[Drawing 5] Other operation gestalten of this invention are shown and it is the same drawing as drawing 3 .

[Drawing 6] Other operation gestalten of this invention are shown and it is the perspective view of the middle imprint belt 7.

[Drawing 7] Other operation gestalten of this invention are shown and it is the same drawing as drawing 3 .

[Drawing 8] It is drawing for explaining the technical problem of this invention.

[Drawing 9] It is drawing for explaining the technical problem of this invention.

[Drawing 10] It is drawing for explaining the technical problem of this invention.

[Description of Notations]

7 -- Toner image support belt (middle imprint belt)

13 -- Imprint roller

14b -- Cleaner

H -- Non-image field

T -- Joint

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(71) 出願人 000002369

セイコーエプソン株式会社

東京都新宿区西新宿2丁目4番1号

(72) 発明者 藤田 恵生

長野県諏訪市大和3丁目3番5号 セイコ

ーエプソン株式会社内

(74) 代理人 100002509

弁理士 白井 博樹 (外7名)

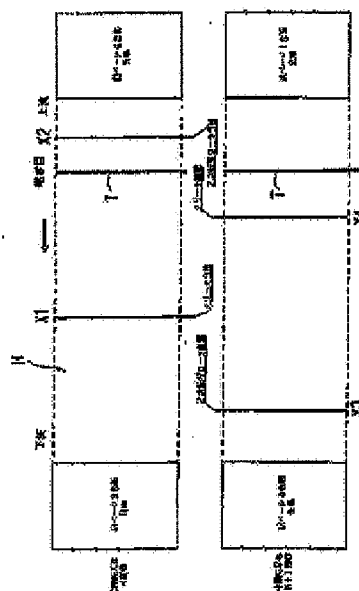
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(54) 【発明の名称】 画像形成装置

(57) 【要約】

【課題】 クリーナの負担を低減しベルトの耐久性を向上させる。

【解決手段】 トナー像担持体ベルトに隣当接可能に配設される転写ローラおよびクリーナを備えた画像形成装置において、前記クリーナの隣当接をトナー像担持体ベルトの縫ぎ目丁の上流側または下流側で行う。



(2)

特開2002-55634

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【特許請求の範囲】

【請求項1】トナー像担持体ベルトに離当接可能に配設される転写ローラおよびクリーナを備えた画像形成装置において、前記クリーナの離当接をトナー像担持体ベルトの継ぎ目の上流側または下流側で行うことを特徴とする画像形成装置。

【請求項2】トナー像担持体ベルトに離当接可能に配設される転写ローラおよびクリーナを備えた画像形成装置において、前記クリーナの当接をトナー像担持体ベルトの継ぎ目の上流側で行い、クリーナの離間を継ぎ目の下流側で行うことを特徴とする画像形成装置。

【請求項3】転写ローラの離間位置をクリーナの当接位置の下流側に設定したことを特徴とする請求項1または2記載の画像形成装置。

【請求項4】クリーナの当接位置を転写ローラの離間位置より上流側に、且つ、前記継ぎ目がクリーナの当接位置と転写ローラの当接位置との間にくるように設定したことを特徴とする請求項1ないし3のいずれかに記載の画像形成装置。

【請求項5】トナー像担持体ベルトへの画像転写開始位置を変更することを特徴とする請求項1ないし4のいずれかに記載の画像形成装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、電子写真法等を用いる複写機、プリンタ、ファクシミリ等の画像形成装置において、とくに、トナー像担持体ベルト上に複数色のトナー像を重ねて転写する方式の画像形成装置に関する。

【0002】

【従来の技術】従来、画像形成装置として、図2に示すように、回転駆動される感光体等の像担持体3と、この像担持体上に複数色の静電潜像を順次形成する潜像形成手段と、前記静電潜像を複数色のトナー像に現像する現像手段と、前記像担持体3に当接して回転する中間転写ベルト7と、前記像担持体3上の複数色のトナー像を前記中間転写ベルト7上に重ね合わせて転写してカラー画像を形成する第1の転写手段T1と、前記中間転写ベルト7上のカラー画像を転写材上に転写する第2の転写手段T2と、前記中間転写ベルト7に残留するトナーを除去するクリーニング手段14とを備える方式が知られている。

【0003】上記画像形成装置において、中間転写ベルト7に継ぎ目が存在する場合には、ベルト上にトナー像を重ね合わせる際、継ぎ目にトナー像がこないように、非画像領域に継ぎ目がくるように制御している。また、第2の転写手段T2における二次転写ローラ13およびクリーニング手段14のクリーナ14bは、各色トナー像の重ね合わせを行っている間は、トナー像を乱さないように中間転写ベルト7から離間させており、転写

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タイミングに合わせて当接を行うようにしている。この場合、クリーナ14bの離間、二次転写ローラ13の離当接についても、中間転写ベルト7上のトナー像を乱さないために、中間転写ベルト7上の非画像領域で行っていた（例えば特開平10-232532号公報参照）。

【0004】

【発明が解決しようとする課題】図8～図10は、本発明の課題を説明するための図であり、これを図2をも参照しつつ説明する。図9は、中間転写ベルト7上にベルト1周分よりやや短い画像領域が形成されている場合を示し、図8は、中間転写体N周目とN+1周目における非画像領域Hにおけるクリーナ14bおよび二次転写ローラ13の離当接位置を示している。ここで、非画像領域Hの先端から後端に向けて、クリーナ14bの当接（X1位置）、二次転写ローラ13の離間（X3位置）、二次転写ローラ13の当接（X2位置）、クリーナ14bの離間（X4位置）の順に設定した場合を考える。

【0005】前ページ3色面後端が通過した位置X1でクリーナ14bを中間転写ベルト7に当接し、また、二次転写ローラ13が中間転写ベルト7に位置X2で当接し転写材が案内されてくる。この状態にて中間転写ベルト7が回転し前ページ4色面の転写材への転写が開始する。クリーナ14bは継ぎ目Tを乗り越え、その後、前ページ4色面後端が通過した位置X3で二次転写ローラ13は離間し、次に、クリーナ14bは再び継ぎ目Tを乗り越えて位置X4で離間する。

【0006】図10に示すように、中間転写ベルト7の継ぎ目Tは、ベルトの両端を直接固着する方式（図A）、ベルトの裏面を接続部材7bにより固着する方式（図B）、ベルトの表面を接続部材7bにより固着する方式（図C）があるが、いずれの場合にも段差を有している。そのため、図8に示す構成とした場合、クリーナ14bの1回の離当接動作に対して、クリーナ14bは2回継ぎ目Tを乗り越えることになり、クリーナ14bに大きな負担がかかり、ベルトの耐久性が低下するという問題を有している。

【0007】本発明は、上記従来の問題を解決するものであって、像担持体ベルトへのクリーナ離当接時に生じる継ぎ目での負担を軽減させ、ベルトの耐久性を向上させることができる画像形成装置を提供することを目的とする。

【0008】

【課題を解決するための手段】そのために本発明の請求項1記載の画像形成装置は、トナー像担持体ベルトに離当接可能に配設される転写ローラおよびクリーナを備えた画像形成装置において、前記クリーナの離当接をトナー像担持体ベルトの継ぎ目の上流側または下流側で行うことを特徴とし、請求項2記載の発明は、トナー像担持体ベルトに離当接可能に配設される転写ローラおよびク

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リーナを備えた画像形成装置において、前記クリーナの当接をトナー像担持体ベルトの継ぎ目の上流側で行い、クリーナの離間を継ぎ目の下流側で行うことを特徴とし、請求項3記載の発明は、請求項1または2において、転写ローラの離間位置をクリーナの当接位置の下流側に設定したことを特徴とし、請求項4記載の発明は、請求項1ないし3のいずれかにおいて、クリーナの当接位置を転写ローラの離間位置より上流側に、且つ、前記継ぎ目がクリーナの当接位置と転写ローラの当接位置との間にくるように設定したことを特徴とし、請求項5記載の発明は、請求項1ないし4のいずれかにおいて、トナー像担持体ベルトへの画像転写開始位置を変更することを特徴とする。

【0009】

【発明の実施の形態】以下、本発明の実施の形態を図面を参照しつつ説明する。図1は、本発明が適用される画像形成装置の例を示す全体構成図である。この画像形成装置は、4色のトナーによりフルカラー画像を形成することができるカラー電子写真プリンタであるが、本発明はこれに限定されるものではなく、複写機、ファクシミリ等の画像形成装置の全てに適用可能である。

【0010】画像形成装置1はハウジング本体2を備え、ハウジング本体2内に感光体3が配設され、図示しない駆動手段によって図示矢印方向に回転駆動される。この感光体3の周囲には、その回転方向に沿って、帯電手段としての帯電ローラ4、感光体3上に静電潜像を形成するための露光ユニット5、静電潜像を現像するための現像器ユニット6、感光体3上に形成されたトナー像を中間転写ベルト7上に転写するための中間転写装置9、感光体3上に残留するトナーを除去するためのクリーニング装置10が配設されている。

【0011】現像器ユニット6は、イエロー用現像器6Y、シアン用現像器6C、マゼンタ用現像器6Mおよびブラック用現像器6Kからなり、各現像器は、現像ハウジング6a内に配設された現像ローラ6bを備えている。そして、これらの現像器6Y、6C、6M、6Kはそれぞれ感光体3に対して恒動可能に配設され、感光体3の1回転毎に選択的に一つの現像器の現像ローラ6bのみが感光体3に当接可能にされている。

【0012】中間転写装置9は、PETフィルム等の表面にアルミ蒸着層を設けさらにその表層に半導電塗料を形成、積層した中間転写ベルト7、中間転写ベルト7を一端帯電させるための一次転写電極ローラ8、中間転写ベルト7を回動させるための駆動ローラ11、感光体3上のトナー像を中間転写ベルト7に転写するための一次転写ローラ（一次転写部）12、中間転写ベルト7上のトナー像を転写材に転写するための二次転写ローラ（二次転写部）13、中間転写ベルト7上の残留トナーを除去するためのクリーニング手段14等から構成されている。二次転写ローラ13およびクリーニング手段14

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は、中間転写ベルト7から離接可能にされている。

【0013】ケース本体2内には転写材の束が収納される給紙カセット15が配設され、ケース本体2の側面には薄紙、OHPシート、封筒等の特殊転写材を供給するための給紙トレイ16が設けられ、また、ケース本体2の上部には画像が転写された転写材を収容する排紙トレイ17が設けられ、給紙カセット15および給紙トレイ16と排紙トレイ17との間に転写材搬送路19が形成されている。転写材搬送路19には、給紙カセット15からの転写材搬送路19aと給紙トレイ16からの転写材搬送路19bが接続されている。転写材搬送路19の二次転写部13の下流側には定着装置20が配設されている。なお、21は両面印刷のための転写材搬送路である。

【0014】給紙カセット15および給紙トレイ16の転写材排出部には、転写材の束に圧接するようにピックアップローラ22が設けられ、ピックアップローラ22に近接してその下流側に別な機構23が配設されている。また、別な機構23の下流側には一對のスキュー補正ローラ24が設けられ、スキュー補正ローラ24の下流側には一對のレジストローラ25が配設されている。なお、26は、給紙カセット15からの転写材を搬送する搬送ローラである。

【0015】上記構成からなる画像形成装置の作用について説明する。図示しないコンピュータからの画像形成信号が入力されると、感光体3が回転駆動され、まず、感光体3の表面が帯電ローラ4によって一様に帯電され、一様に帯電された感光体3の表面に、露光ユニット5によって第1色目（例えばイエロー）の画像情報に応じた選択的な露光Lがなされ、イエローの静電潜像が形成される。

【0016】感光体3には、イエロー用現像器6Yの現像ローラ6bのみが接触し、これによってイエローの静電潜像のトナー像が感光体3上に形成される。中間転写ベルト7の側端部には一次転写電極ローラ8により上記トナー像の帯電極性と逆極性の一次転写電圧が印加され、感光体3上に形成されたトナー像が、一次転写部12において中間転写ベルト7上に転写される。このとき、二次転写ローラ13およびクリーニング手段14は、中間転写ベルト7から離間、退避されている。感光体3上の残留トナーはその都度クリーニング装置10によって除去された後、感光体3の表面は帯電手段（図示せず）により除電される。

【0017】上記の動作が画像形成信号の第2色目、第3色目、第4色目に対応して、感光体3と中間転写ベルト7の1回転による潜像形成、現像、転写が繰り返され、前記画像形成信号の内容に応じた4色のトナー像が中間転写ベルト7上において重ね合わされて転写される。そして、このフルカラー画像が二次転写部13に達するタイミングで、レジストローラ25が駆動し転写材

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が転写材搬送路19を経て二次転写部13に供給され、このとき、二次転写ローラ13およびクリーニング手段14が中間転写ベルト7に当接されるとともに二次転写ローラに二次転写電圧が印加され、中間転写ベルト7上のフルカラートナー像が転写材上に転写される。中間転写ベルト7上の残留トナーはクリーニング手段14により除去される。転写材上に転写された転写像は定着装置20により定着され排紙トレイ17に排紙される。

【0018】図2は、図1の中間転写装置9の拡大図であり、30はテンションローラ、31は二次転写バックアップローラ、32はクリーナバックアップローラ、33は一次転写サポートローラである。

【0019】中間転写ベルト7は、厚み0.1mmのPETフィルムの表面にアルミ蒸着層を設け、さらにその表層に半導電塗料を0.02の厚みで塗布されている。また、ベルトの片端には半導電塗料が塗布されていない領域を設け、アルミ蒸着層の表面にカーボン電極層を幅6.3mmで設けている。このカーボン電極層の表面には、駆動ローラ11と対向する位置に一次転写電極ローラ8を配設し、中間転写ベルト7の回転に伴って連れ回りする構成となっている。一次転写電極ローラ8には、図示しない高圧電源からのバイアスが印加されており、このバイアスは一次転写電極ローラ6、中間転写ベルト7のカーボン電極層を介してアルミ蒸着層に印加され、中間転写ベルト7は均一に帯電される構成になっている。

【0020】一次転写部1に達した感光体3上のトナー像は、感光体3と中間転写ベルト7がニップし且つアルミ蒸着層に印加された一次転写バイアスにより中間転写ベルト7上に一次転写される。これを感光体3上に順次形成されるトナー像に対し行われ、中間転写ベルト7上に色合わせされる。このとき、二次転写ローラ13およびクリーニング手段14は、中間転写ベルト7上のトナー像を乱さないように離間状態にされている。中間転写体ベルト上に最終色（例えば4色目）のトナー像の一次転写が開始され、重ね合わされた画像は中間転写ベルト7の回転に伴い二次転写部2へと到達し、このタイミングに合わせて二次転写部2に転写材が案内されるとともに、二次転写ローラ13は中間転写ベルト7に当接される。二次転写ローラ13には図示しない高圧電源によりその端部に高圧のバイアスが印加され、その電界の作用により中間転写ベルト7上のトナー像は転写材に一括転写される。

【0021】二次転写ローラ13は、離当接フレーム13aにより支持され、離当接フレーム13aは中間転写体ユニットのフレームに対し、支点軸を中心に回転自在に支持されている。二次転写離当接フレーム13aには前後にカムフォロアが設けられ、このカムフォロアを二次転写離当接カム13bが案内することで、離当接フレーム13aの回転を規制するようにしている。離当接カ

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ム13bの軸には図示しないモータにクラッチを介して連結されており、このクラッチをオンオフすることにより、二次転写離当接カム13bの回転を規制し二次転写ローラ13の離当接動作を行うようにしている。

【0022】中間転写体7上に二次転写されずに残留したトナーは、クリーニング手段14へと連し、これにタイミングを合わせてクリーナ14bの当接が行われる。クリーナ14b先端が中間転写体7に接触すると、その瞬間は圧力が弱いため、クリーナ14b先端に付着しているトナーが中間転写ベルト7上に退戻りし中間転写ベルト7上には露状の汚れが付着する。その後、クリーナ14bに所定の圧力がかかりクリーニング可能な状態となる。

【0023】クリーニング手段14は、クリーナケース14aと、クリーナ（クリーニングブレード）14bと、すくいシート14cと、クリーナ14bを中間転写ベルト7に離当接させるためのクリーナ離当接カム14eを備え、離当接カム14eの軸には図示しないモータにクラッチを介して連結されており、このクラッチをオンオフすることにより、クリーナ離当接カム14eの回転を規制しクリーナ14bの離当接動作を行うようにしている。

【0024】図3は、本発明の実施形態を示し、クリーナおよび二次転写ローラの離当接の位置を説明するための図であり、中間転写ベルト7上にベルト1周分よりやや短いトナー像を転写する場合で、中間転写体N周目とN+1周目における非画像領域Hにおけるクリーナ14bと二次転写ローラ13の離当接の位置を示している。

【0025】本実施形態においては、中間転写体7の非画像領域H内に継ぎ目Tを位置させるとともに、クリーナ14bの当接位置X1とクリーナ14bの離間位置X4を共に継ぎ目Tの下流側に設定している。従って、前ページ3色面後端が通過した位置X1でクリーナ14bが中間転写ベルト7に当接した後、中間転写体ベルト7が回転し、クリーナ14bは継ぎ目Tを乗り越え、前ページ4色面後端が通過し、且つ継ぎ目Tの下流側の位置X4で離間される。従って、クリーナ14bの継ぎ目Tの乗り越えは1回となり、クリーナ14bの負荷が低減されることになる。

【0026】また、本実施形態においては、二次転写ローラ13の離間位置X3をクリーナ14bの当接位置X1の下流側に設定している。前ページ3色面後端が通過した位置X1でクリーナ14bを中間転写ベルト7に当接したとき、中間転写ベルト7上には露状の汚れが付着する。また、二次転写ローラ13が中間転写ベルト7に位置X2で当接し転写材が案内されてくる。この状態にて中間転写体ベルトが回転し前ページ4色面の転写材への転写が開始する。その後、前ページ4色面後端が通過した位置X3、前記クリーナ当接前位置X1が二次

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転写部T2に達する前で二次転写ローラ13は離間する。従って、この筋状汚れにより二次転写ローラ13が汚染されることはない。

【0027】さらに、本実施形態においては、クリーナ14bの当接位置X1が二次転写ローラ13の離間位置X3より上流側にあり、且つ、継ぎ目Tがクリーナ14bの当接位置X1と二次転写ローラ13の当接位置X2との間にくるように設定している。クリーナ14bは、前ページ4色面後端が通過し、且つ継ぎ目Tの下流側の位置X4で離間される。クリーナ14bが中間転写ベルト7から離れる瞬間、ブレードには圧力が殆どないため、中間転写ベルト7上には筋状汚れが付着する。

【0028】連続印字中は、この状態のまま次の印字動作に入り、中間転写ベルト7上に次ページの重ね合わされたトナー像の先端が二次転写部T2に達すると、二次転写ローラ13は当接される。この当接タイミングは、前述のクリーナ離間筋汚れが、二次転写部T2を越えてから当接させるようにする。従って、この汚れにより二次転写ローラ13が汚染されることはない。

【0029】再び、残画トナーの先端部に合わせて、クリーナ14bの当接が行われる。このとき、先のクリーナの離間筋汚れがクリーニング部に到達する前に、クリーナ14bは中間転写ベルト7に当接するため、クリーナの離間筋汚れをクリーニングすることができる。連続印字中は、これら一連の動作を繰り返し、二次転写ローラ13が汚染されることなく印字動作を行うことができる。

【0030】また、二次転写ローラ13の当接は、継ぎ目Tが通り過ぎた後で行われる。継ぎ目Tは、図10に示すように、段差があるため、ここにトナー（黒色部分）が溜まり易くなっており、この部分を二次転写ローラ13が随分とトナーにより汚染されることになる。本実施形態においては、二次転写ローラ13を継ぎ目Tを通過した後で当接させることにより、二次転写ローラ13の汚れを防止することができる。

【0031】図4は、図3のタイミングチャートを示す図である。ここで、基準信号とは、中間転写部7に設けた開口穴7a（図9）を透過型センサにて検知することにより発生する信号であり、中間転写ベルト7の1回転につき1回の信号が出力され、以下のタイミングはこの信号に基づいて作成される。1次転写タイミングは、一次転写部T1に感光体3上のトナー像がくるタイミングであり、本例では4色を2ページ分転写している。ゲートローラは、ゲートローラにより転写材がくるタイミングであり、4色の重ね合わされた画像が二次転写部T2に到達するタイミングに合わせて二次転写部T2に転写材が案内される。二次転写ローラ離間接クラッチは、二次転写ローラ離間接クラッチがオンオフするタイミングであり、このタイミングから少し遅れて二次転写ローラ13が中間転写部7に離間接される。二次転写タイミン

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グは、二次転写部T2に中間転写ベルト7上の重ね合わされた画像がくるタイミングである。クリーナ離間接クラッチは、クリーナ離間接クラッチがオンオフするタイミングであり、クリーナ離間接は、クリーナ離間接クラッチがオンオフした後、クリーナが中間転写ベルト7に接触または非接触するタイミングである。

【0032】図5は、本発明の他の実施形態を示し、図3と同様の図である。なお、以下の説明において図3と同一の構成については同一番号を付して説明を省略する。図3の実施形態においては、クリーナ14bの当接位置X1、X4を共に継ぎ目Tの下流側に設定しているが、本実施形態においては、クリーナ14bの当接位置X1、X4を共に継ぎ目Tの上流側に設定する点で相違している。要するにクリーナ14bの当接位置X1、X4を共に継ぎ目Tの一方の側の非画像領域Hに設定すればよい。

【0033】図6は、本発明の他の実施形態を示し、中間転写ベルト7の斜視図である。中間転写ベルト7を用いた画像形成装置においては、スループットをおとさない、つまり、クリーニングのための空回しを入れずに印字を行うためには、クリーナの離間接は、中間転写ベルト上のトナー像を乱さないために非画像領域で行わなければならない。クリーナが実際に中間転写ベルトに離間接するタイミングには、製造公差によるバラツキがあるため、非画像領域は長い方がタイミングの設計はし易い。しかしながら、非画像領域の長さは、中間転写ベルトの周長と画像長さによって決まるため、非画像領域を長くするには、中間転写ベルトの周長を長くする必要があり、そのため装置が大型化するとともにコストアップを招いてしまう。

【0034】そこで、本実施形態においては、中間転写ベルト7上の画像転写開始位置を変化させるように構成する。図9に示すように、中間転写ベルト7には、前述のカーボン電極の逆端部に開口穴7aが設けられており、ここを透過型センサで読むことにより基準信号を取り出し、この信号を基準に画像を転写している。今、基準信号が入力されてからt1(sec)後に画像を転写し始め、このときの継ぎ目T位置が画像先端からt2(sec)下流側に位置し、クリーナの離間接も基準信号を基に動作し、当接・離間タイミングをそれぞれ基準信号からt3、t4(sec)後に動作させると、中間転写ベルト上の各位置は、図9に示すようになる。すなわち、継ぎ目Tを境にクリーナの離間接が上下流側に分かれている。

【0035】そこで、図6に示すように、画像転写開始位置を $\alpha$ (sec)送らせてt1+ $\alpha$ (sec)後とし、クリーナの離間接も同様にt3+ $\alpha$ 、t4+ $\alpha$ (sec)後とする。これにより、クリーナの離間接位置は継ぎ目Tの上流側に入ることになる。すなわち、画像転写開始位置も変化させることにより、非画像領域の長さを変えるこ



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となく、クリーナの離当接のタイミングを容易に設定することができる。クリーナの離当接のバラツキを吸収することができる。なお、クリーナの離当接位置を共に継ぎ目Tの下流側にする場合には、画像転写開始位置を早めればよい。

【0036】図7は、本発明の他の実施形態を示し、図3と同様の図である。本実施形態においては、クリーナ14bの当接位置X1を継ぎ目Tの上流側とし、クリーナ14bの離間位置X4を継ぎ目Tの下流側にくるように設定している。これによれば、クリーナ14bの当接は継ぎ目Tを過ぎた後に行われ、その後、二次転写ローラ13が当接され二次転写が行われ、中間転写ベルト7が1回転すると二次転写13は離間される。その後、継ぎ目Tの手前でクリーナ14bが離間する。従って、クリーナ14bが当接してから離間するまで一度も継ぎ目Tを乗り越えることがなく、継ぎ目Tを乗り越えることによるクリーナ14bの負荷を無くすることができる。ただし、本実施形態では、クリーナ14bの離間筋が通りすぎた後に次ぎのサイクルでクリーナ14bが当接するため、クリーナ離間筋が常に残留することになるが、これは別途、クリーニングサイクルで除去すればよい。

【0037】以上、本発明の実施の形態について説明したが、本発明はこれに限定されるものではなく種々の変更が可能である。例えば、上記実施形態においては、トナー像担持体として中間転写ベルトに適用した例について説明しているが、感光ベルト上にトナー像を重ねる方式にも適用可能である。

【0038】

【発明の効果】以上の説明から明らかなように、請求項1記載の発明によれば、クリーナの継ぎ目の乗り越えは1回となり、クリーナの負荷が低減され、ベルトの耐久性を向上させることができ、請求項2記載の発明によれば\*

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\*は、クリーナの継ぎ目の乗り越えが無くなり、クリーナの負荷がさらに低減され、請求項3記載の発明によれば、クリーナ当接筋による転写ローラの汚染を防止することができる、請求項4記載の発明によれば、クリーナ離間筋による転写ローラの汚染を防止することができるとともに、継ぎ目に付着するトナーによる転写ローラの汚染を防止することができる、請求項5記載の発明によれば、非画像領域の長さを変えることなく、クリーナの離当接のタイミングを容易に設定することができる、クリーナの離当接のバラツキを吸収することができる。

【図面の簡単な説明】

【図1】本発明が適用される画像形成装置の例を示す全体構成図である。

【図2】図1の中間転写装置9の拡大図である。

【図3】本発明におけるクリーナおよび二次転写ローラの離当接位置を示す図である。

【図4】図3のタイミングチャートを示す図である。

【図5】本発明の他の実施形態を示し、図3と同様の図である。

【図6】本発明の他の実施形態を示し、中間転写ベルト7の斜視図である。

【図7】本発明の他の実施形態を示し、図3と同様の図である。

【図8】本発明の課題を説明するための図である。

【図9】本発明の課題を説明するための図である。

【図10】本発明の課題を説明するための図である。

【符号の説明】

7…トナー像担持体ベルト（中間転写ベルト）

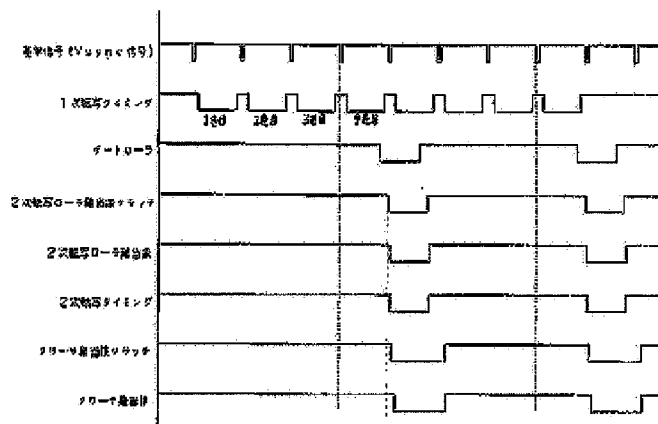
13…転写ローラ

14b…クリーナ

H…非画像領域

T…継ぎ目

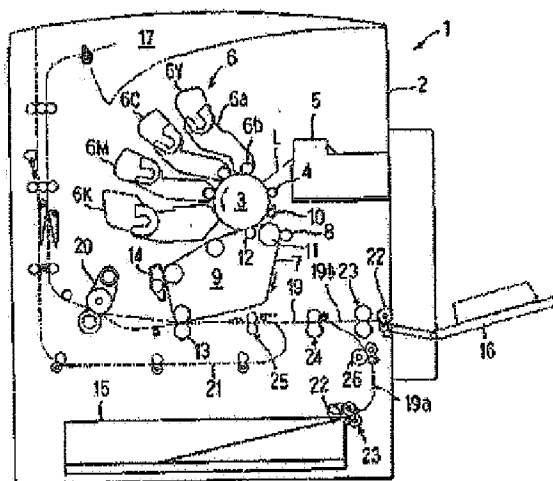
【図4】



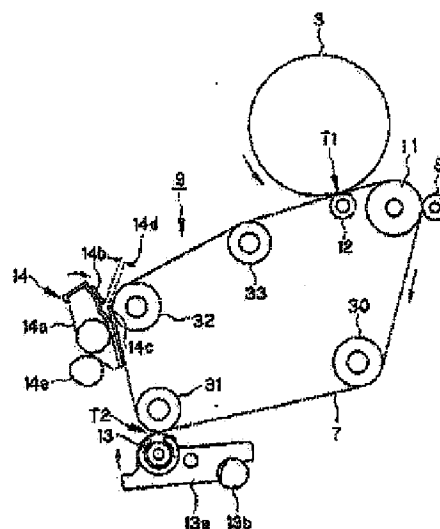
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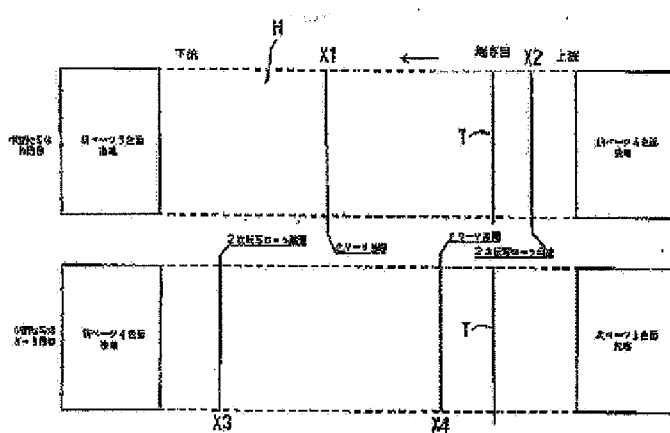
【図1】



【図2】



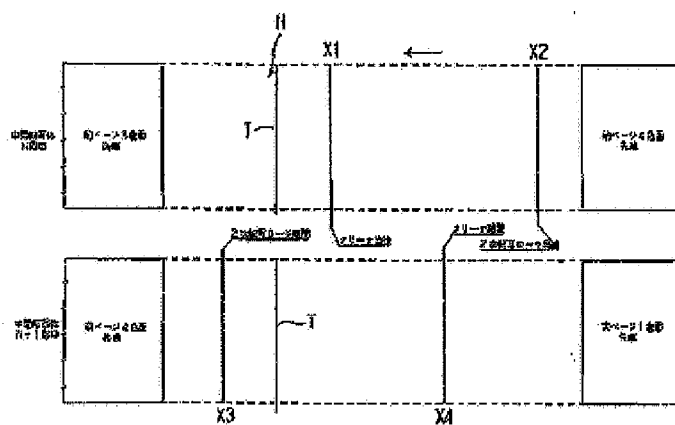
【図3】



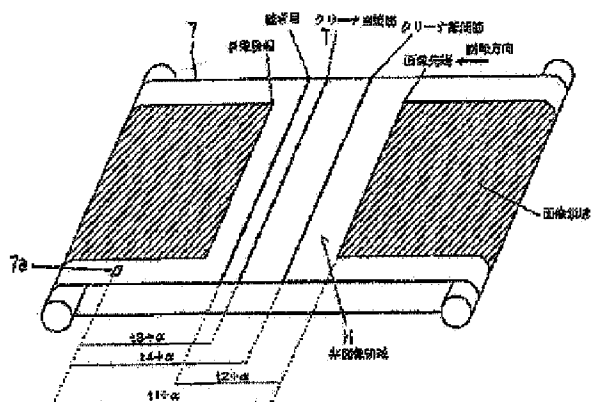
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[ 5 ]



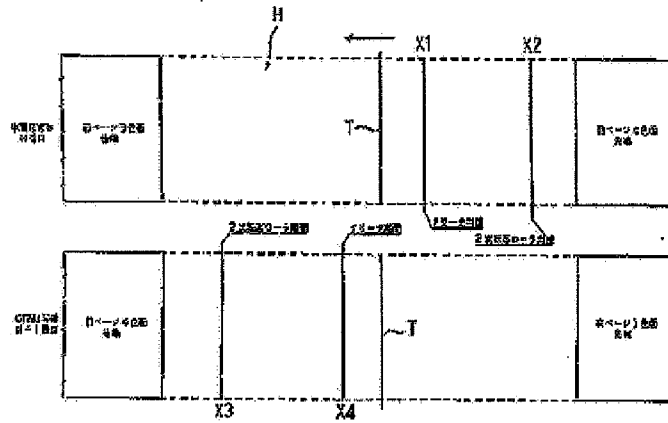
【圖6】



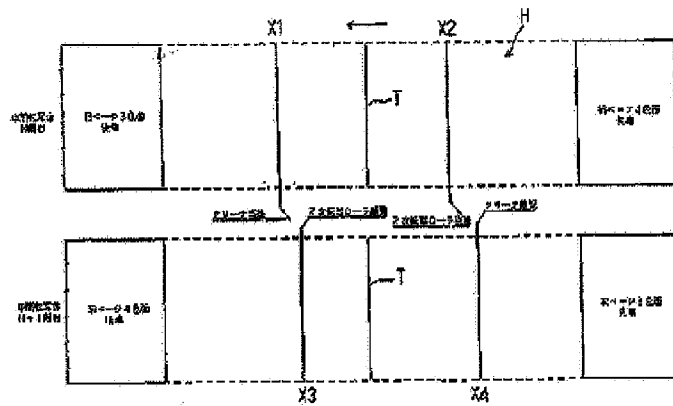
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【図7】

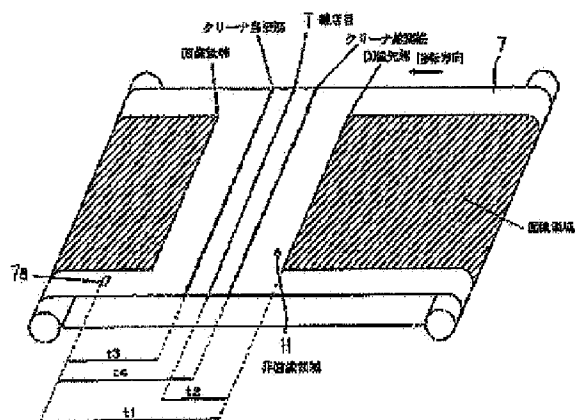


【図8】



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【图9】



【圖10】

